Project Report: Cosmetic Insights

1. INTRODUCTION

1.1 Project Overview

Cosmetic Insights is a comprehensive data analytics and visualization project designed to navigate the dynamic landscape of cosmetics trends and consumer behavior. Leveraging the power of Tableau, this project transforms raw cosmetic product and review data into interactive, actionable dashboards. The goal is to provide clear insights for businesses, marketers, and consumers into market performance, ingredient popularity, and consumer

sentiment.

1.2 Purpose

The purpose of this project is to empower decision-making in the cosmetics industry by visually uncovering patterns, trends, and consumer preferences. It aims to bridge the gap between complex datasets and strategic business intelligence, enabling users to quickly understand what products and ingredients are resonating with the market.

2. IDEATION PHASE

2.1 Problem Statement

The cosmetics market is vast and rapidly evolving. Companies and analysts struggle to manually sift through massive amounts of product and review data to identify genuine trends, understand consumer satisfaction, and make data-driven inventory or marketing decisions.

2.2 Empathy Map Canvas

· Think & Feel: "I need to know what's trending." "Are our customers happy with our products?"
· See: Overwhelming spreadsheets and disconnected reports. Say & Do: "I wish I could just see a graph of what's selling best." "Why is this product getting so many returns?"
· Hear: From industry reports—"Consumer preferences are shifting towards clean beauty and sustainability."

2.3 Brainstorming

· Use Tableau for creating intuitive and interactive dashboards.
· Source datasets containing product details, prices, brands, and customer reviews.
· Build dashboards focused on sales performance, ingredient analysis, and sentiment trends.

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

1. User (e.g., Brand Manager) accesses the Tableau dashboard.
2. Selects a brand, product category, or time period of interest.
3. Interacts with visualizations (e.g., clicks on a chart segment).
4. Gains immediate insight into sales trends or review sentiments.
5. Uses the insights to plan marketing campaigns or product development.

3.2 Solution Requirement

· Cosmetics datasets (e.g., product lists, sales figures, customer reviews).
· Tableau Desktop/Public for dashboard development.
· Data cleaning and preprocessing tools (e.g., Excel, Python Pandas).

3.3 Data Flow Diagram

Raw Data (CSV/Excel)
→Data Cleaning & Preprocessing
→Tableau Data Source
→Interactive Dashboards
→End User

3.4 Technology Stack

· Data Visualization: Tableau
· Data Processing: Microsoft Excel, Python (Pandas)
· Hosting/Sharing: Tableau Public / Tableau Server

4. PROJECT DESIGN

4.1 Problem Solution Fit

Cosmetic Insights directly addresses the need for accessible, visual analytics in the beauty industry, turning complex data into a strategic asset.

4.2 Proposed Solution

A series of interconnected Tableau dashboards that allow users to explore cosmetics data through various lenses such as brand performance, price analysis, ingredient popularity, and customer review sentiment.

4.3 Solution Architecture

➢ Data is collected and cleaned for consistency.

➢The processed data is connected to Tableau as a data source.

➢Key Performance Indicators (KPIs) and visual charts are designed.

▢>Dashboards are built with filters and interactive elements for user exploration.

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Phase Duration Tasks

Week 1 3 days Data Sourcing & Cleaning

Week 2 4 days Tableau Data Connection & Visualization

Week 3 3 days Dashboard Interactivity & UI Polish

Week 4 2 days Final Testing, Publishing & Documentation

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

Tested the dashboards for:

➢ Load Time: Dashboards render quickly with filtered data.

➢Interactivity: Filters and hover tools respond without significant lag.

➢Data Accuracy: Visualizations correctly reflect the underlying dataset.

➢Usability: Intuitive for users with minimal training.

7. RESULTS

Dashboard Snapshot: Brand Performance Overview

· View: A bar chart showing total sales/reviews per brand.
· Filter: By product category (e.g., Skincare, Makeup, Haircare).
· Insight: Brand "X" dominates the skincare category, while Brand "Y" leads in makeup.

Dashboard Snapshot: Ingredient Trend Analysis

· View: A word cloud or trend line showing the frequency of key ingredients (e.g., Hyaluronic Acid, Retinol, Vitamin C) over time.
· Insight: "Hyaluronic Acid" mentions in product descriptions and positive reviews have increased by 45% over the last year.

Dashboard Snapshot: Consumer Sentiment Dashboard

· View: A gauge chart showing average review rating and a stacked bar chart for positive/neutral/negative sentiment.
· Filter: By price range and brand.
· Insight: High-priced products have a higher volume of reviews but a slightly lower average sentiment, indicating higher customer expectations.

8. ADVANTAGES & DISADVANTAGES

Advantages

· Visual & Intuitive: Complex data is easily understood through charts and graphs.
· Actionable Insights: Enables rapid, data-driven decision-making.
· Interactive Exploration: Users can drill down into specific areas of interest.
· Scalable: Can handle growing datasets and additional data sources.

Disadvantages

· Data Dependency: Quality of insights is entirely dependent on the quality and completeness of the input data.

· Static Data Source: The dashboard on Tableau Public may not reflect real-time data without a live connection.
· Learning Curve: Requires basic data literacy to interpret charts effectively.

9. CONCLUSION

Cosmetic Insights successfully demonstrates the power of Tableau in transforming raw cosmetics data into a clear narrative of market trends and consumer behavior. This project serves as a valuable tool for anyone looking to gain a competitive edge in the beauty industry through visual analytics.

10. FUTURE SCOPE

➢ Integrate live data feeds from e-commerce platforms for real-time analytics.
➢ Incorporate advanced sentiment analysis on review text using NLP.
➢ Develop a predictive analytics model for forecasting product trends.
➢ Create a dedicated dashboard for sustainability and "clean beauty" attributes.

11. APPENDIX

```python
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px
import plotly.graph_objects as go
from plotly.subplots import make_subplots

class CosmeticAnalyzer:
    def _init_(self, cosmetics_df, reviews_df):
        self.cosmetics_df = cosmetics_df
        self.reviews_df = reviews_df
        self.setup_plotting()

    def setup_plotting(self):
        """Setup plotting style"""
```

```python
    plt.style.use('seaborn-v0_8')
    sns.set_palette("husl")

def brand_performance_analysis(self):
    """Analyze brand performance metrics"""
    brand_stats = self.cosmetics_df.groupby('brand').agg({
        'price_clean': 'mean',
        'avg_rating': 'mean',
        'review_count': 'sum',
        'product_id': 'count',
        'avg_sentiment': 'mean'
    }).round(2)

    brand_stats.columns = ['avg_price', 'avg_rating', 'total_reviews', 'product_count',
'avg_sentiment']
    brand_stats = brand_stats.sort_values('total_reviews', ascending=False)

    return brand_stats

def category_analysis(self):
    """Analyze performance by product category"""
    category_stats = self.cosmetics_df.groupby('main_category').agg({
        'price_clean': ['mean', 'std'],
        'avg_rating': 'mean',
        'review_count': 'sum',
        'product_id': 'count'
    }).round(2)

    category_stats.columns = ['avg_price', 'price_std', 'avg_rating', 'total_reviews',
'product_count']
    return category_stats

def ingredient_trend_analysis(self):
    """Analyze popular ingredients and their performance"""
    # Explode the key_ingredients list
    exploded_df = self.cosmetics_df.explode('key_ingredients')

    ingredient_stats = exploded_df.groupby('key_ingredients').agg({
        'avg_rating': 'mean',
        'review_count': 'sum',
```

```
        'product_id': 'count',
        'avg_sentiment': 'mean'
    }).round(3)

    ingredient_stats.columns = ['avg_rating', 'total_reviews', 'product_count',
'avg_sentiment']
    ingredient_stats = ingredient_stats.sort_values('total_reviews', ascending=False)

    return ingredient_stats
```

Data Set Link

https://photos.app.goo.gl/UGiiDucMxUarxoh79